



# Science Standards of Learning *Sample Scope & Sequence*

## Grade 1

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P.O. Box 2120  
Richmond, Virginia 23218-2120  
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**Superintendent of Public Instruction**

Jo Lynne DeMary

**Deputy Superintendent for Instruction**

Patricia I. Wright

**Assistant Superintendent for Instruction**

Linda M. Wallinger

**Office of Elementary Instructional Services**

Linda Poorbaugh, Director

Paula J. Klonowski, Science Specialist

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## **Preface**

As an additional resource to help school divisions develop curricula aligned to the 2003 Standards of Learning, the Virginia Department of Education has developed sample scope and sequence documents for kindergarten through grade eight and for core high school courses. These sample documents provide guidance on how the essential knowledge, skills, and processes that are identified in the Standards of Learning and the Standards of Learning Curriculum Frameworks may be introduced to students in a logical, sequential, and meaningful manner.

These sample scope and sequence documents are intended to serve as general guides to help teachers and curriculum developers align their curricula and instruction to support the Standards of Learning. Each sample document is organized around specific topics to help teachers present information in an organized, articulated manner. Also included are correlations to the Standards of Learning for that curricular area for a particular grade level or course, as well as ideas for classroom assessments and teaching resources.

The sample scope and sequence documents are not intended to prescribe how curriculum should be developed or how instruction should be delivered. Instead, they provide examples showing how teachers and school divisions might present to students in a logical and effective manner information that has been aligned with the Standards of Learning. School divisions that need assistance in developing curricula aligned with the Standards of Learning are encouraged to consider the sample scope and sequence guides. Teachers who use the documents should correlate the content identified in the guides with available instructional resources and develop lesson plans to support instruction.

The *Science Standards of Learning Sample Scope and Sequence* and the *Science Standards of Learning Curriculum Framework* can be found in both PDF and Microsoft Word file formats on the Virginia Department of Education's Web site at <http://www.doe.virginia.gov/VDOE/Instruction/sol.html>.

## **Introduction**

The following sample scope and sequence is based on the essential content, skills, and processes developed for each First Grade standard in the *Science Standards of Learning Curriculum Framework*. It is not intended to be a complete or exhaustive set of all that students should master at this level, but instead the scope and sequence organizes a core of key skills, content, and processes around basic topic areas.

The topic areas generally correspond to individual standards; however, certain standards are reorganized and grouped with components of other standards to comprise meaningful instructional clusters. The various topics are not intended to require equal instructional time. Additional objectives have not been developed, and no attempt has been made to transition or further explain the content. Additional information may be obtained from the overview and introductory sections of the First Grade *Science Standards of Learning Curriculum Framework* (<http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html>).

An important and consistent thread among these organizational topics is the application of inquiry skills throughout. Students should have an opportunity to master the various science concepts in each topic area in the context of active learning and inquiry processes. The focus on inquiry is further reinforced by having the first topic in the scope and sequence as a discrete treatment of the science skills; however, a discrete treatment is certainly not required. This represents only one way to organize instruction; there are many other valid and useful organizational schemes.

Effective science teaching requires assessing and understanding what students know and need to learn and then challenging and supporting them to learn it well. The array of effective assessment techniques that teachers can employ in the classroom goes well beyond traditional assessments, and science instruction lends itself well to alternative approaches such as portfolios, student self assessments, and short videotaped presentations. The assessments mentioned in the scope and sequence are intended to be general. It is the role of the local curriculum to develop a detailed review of what is most effective for the particular concept being developed.

The resources section included in this scope and sequence provides a brief sample of instructional resources and staff development materials that are generally available without charge. There is a significant body of commercially available instructional materials that correlates well with the Science Standards of Learning and is of very high quality. This document, however, does not include references to those materials.

<b>Organizing Topic</b>	<b>Related Standards</b>
<b>Investigation Skills</b>	<b>1.1</b>
<b>Investigating Day and Night</b>	<b>1.6, 1.1</b>
<b>Investigating Plants</b>	<b>1.4, 1.1</b>
<b>Investigating Animals</b>	<b>1.5, 1.1</b>
<b>Investigating Seasonal Changes and Life Processes</b>	<b>1.7, 1.1</b>
<b>Investigating Natural Resources</b>	<b>1.8, 1.1</b>
<b>Investigating Interactions with Water</b>	<b>1.3, 1.1</b>
<b>Investigating Motion</b>	<b>1.2, 1.1</b>

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigation Skills</b>  (A discrete introduction to specific science skills is not necessary as all of the inquiry skills should be incorporated within the following topical areas. Teachers may consider introducing some of these skills in isolation or coordinated with mathematics, English, and history instruction.)	<b>Students should be able to:</b>	1.1	Student demonstrations  Classroom observations  Student work	<i>Teaching and Learning the Basic Science Skills</i> videotape teacher training series, site guide: <a href="http://www.doe.virginia.gov/VDOE/Instruction/sol.html">http://www.doe.virginia.gov/VDOE/Instruction/sol.html</a>  <i>Science SOL Curriculum Framework:</i> <a href="http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html">http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html</a>
	use their senses and simple tools, such as a magnifying glass, ruler, and thermometer, to enhance their observations of physical properties.  classify and arrange objects or events according to at least two attributes or properties so that similarities and differences become apparent.  communicate observations made and data collected orally and with simple graphs, pictures, written statements, and numbers.  measure length, mass, and volume, using standard and nonstandard units and appropriate instruments. By the third grade, students will be expected to have basic facility with metric measures, including centimeters, grams, and liters.  use familiar events and objects to make inferences and draw conclusions.  predict outcomes based on actual observations and evidence rather than random guesses.			

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigation Skills</b> (continued)	answer questions by conducting simple experiments/investigations, using simple tools, such as thermometer, ruler, or magnifying glass. A simple experiment is one that changes only one thing at a time (tests only one variable), gives quick results, and provides easily observable changes.	1.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigating Day and Night</b>	<b>Students should be able to:</b> infer that sunlight striking an object makes the object warmer. conduct simple experiments to show how sunlight changes the temperature of land, air, and water. demonstrate and describe the concept of rotation. comprehend that day and night are caused by Earth's rotation. compare and contrast day and night by characteristic changes in temperature and light. model the rotation of Earth and its physical relationship to the sun. interpret the relationship between the sun's position in the sky and the general time of day. This includes the sun's relative position in the morning (East), at noon, and in the late afternoon (West).	1.6	Student demonstrations Classroom observations Student work	<i>The Earth in Space Teacher Training Module:</i> <a href="http://www.smv.org/pubs/index.html">http://www.smv.org/pubs/index.html</a>
	apply the 1.1 science skills in the context of the content of this topic.	1.1		



Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Plants	<b>Students should be able to:</b>	1.4	Student demonstrations  Classroom observations  Student work	
	conduct simple experiments/investigations related to plant needs by changing one variable (food, air, water, light, or place to grow) at a time. <b>Students do not need to know the term <i>variable</i>.</b>  create and interpret a model/drawing of a plant, including seeds, roots, stems, leaves, blossoms, and fruits.  identify the functions of the seed, root, stem, and leaf.  classify plants by the characteristics of edible/nonedible, flowering/nonflowering, and evergreen/deciduous, using tables, charts, and picture graphs.			
	apply the 1.1 science skills in the context of the content of this topic.	1.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigating Animals</b>	<p><b>Students should be able to:</b></p> <p>make and communicate observations of live animals, including people, about their needs, physical characteristics, and where they live.</p> <p>describe the life needs of animals including air, food, water, and a suitable place to live.</p> <p>identify and chart simple characteristics by which animals can be classified, including body coverings (hair, fur, feathers, scales, and shells), body shape, appendages (arms, legs, wings, fins, and tails), methods of movement (walking, crawling, flying, and swimming), wild or tame, and water homes or land homes.</p> <p>distinguish between wild animals (raccoon, hawk, squirrel, shark) and tame animals (dog, cat, sheep) and recognize examples of each.</p> <p>infer types of animal homes (water or land), using the physical characteristics of the animals, such as scales and fins that allow fish to live and move in water or fur and legs that allow dogs to live and move on land.</p> <p>classify animals by where they live (their homes).</p>	1.5	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p>	<p><i>Project WILD:</i>  <a href="http://www.dgif.state.va.us/education/wildlife_education.html">http://www.dgif.state.va.us/education/wildlife_education.html</a></p>
	<p>apply the 1.1 science skills in the context of the content of this topic</p>	1.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigating Seasonal Changes and Life Processes</b>	<b>Students should be able to:</b>	1.7	Student demonstrations  Classroom observations  Student work	<i>The Earth in Space Teacher Module:</i> <a href="http://www.smv.org/pubs/index.html">http://www.smv.org/pubs/index.html</a>
	<p>identify types of precipitation as rain, snow, and ice and the temperature conditions that result in each one.</p> <p>relate a temperature and precipitation chart to the corresponding season (daily or weekly).</p> <p>measure and chart changes in plants, including budding, growth, wilting, and losing leaves. Recognize in what season budding and wilting will most likely occur.</p> <p>predict how an outdoor plant would change through the seasons.</p> <p>compare and contrast the four seasons of spring, summer, fall (autumn) and winter in terms of temperature, light, and precipitation.</p> <p>compare and contrast the activities of some common animals (e.g., squirrels, chipmunks, butterflies, bees, ants, bats, and frogs) during summer and winter by describing changes in their behaviors and body covering.</p>			

<b>Organizing Topic</b>	<b>Essential Knowledge, Skills, and Processes</b>	<b>Related SOL</b>	<b>Sample Classroom Assessment Methods</b>	<b>Sample Resources</b>
<b>Investigating Seasonal Changes and Life Processes</b> (continued)	<p>compare and contrast how some common plants (e.g., oak trees, pine trees, and lawn grass) appear during summer and winter.</p> <p>comprehend the concepts of hibernation, migration, and habitat, and describe how these relate to seasonal changes. (It may be useful to recognize common Virginia animals that hibernate and migrate, but specific names of animals is not the focus of student learning here.)</p> <p>infer from people’s dress, recreational activities, and work activities what the season is.</p>	1.7		
	<p>apply the 1.1 science skills in the context of the content of this topic.</p>	1.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigating Natural Resources</b>	<p><b>Students should be able to:</b></p> <p>identify natural resources such as plants and animals, water, air, land, minerals, forests, and soil.</p> <p>recognize that many natural resources are limited.</p> <p>compare and contrast ways of conserving resources. This includes recycling, reusing, and reducing consumption of natural resources.</p> <p>classify factors that affect air and water quality.</p> <p>describe ways students and schools can help improve water and air quality in our communities.</p> <p>determine some basic factors that affect water quality by conducting simple investigations in the school environment. Students should be able to make and record observations of what happens to runoff water on rainy days. (Related to 1.3.)</p> <p>predict what would happen if natural resources were used up, and explain ways to prevent this from happening.</p> <p>discuss the value of parks to wildlife and to people.</p>	1.8	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p>	<p><i>VA Natural Resources Education Guide:</i>  <a href="http://www.vanaturally.org/guide.html">http://www.vanaturally.org/guide.html</a></p> <p><i>Project WILD, K-12</i>  <a href="http://www.dgif.state.va.us/education/wildlife_education.html">http://www.dgif.state.va.us/education/wildlife_education.html</a></p> <p><i>Project WILD Aquatic:</i>  <a href="http://www.projectwild.org/materials/materials.htm">http://www.projectwild.org/materials/materials.htm</a></p> <p><i>Project Learning Tree, K-8:</i>  <a href="http://www.plt.org/">http://www.plt.org/</a></p> <p><i>Pollution Solutions: Litter Prevention Activities for Virginia Teachers:</i>  <a href="http://www.deq.state.va.us/education/pollution/">http://www.deq.state.va.us/education/pollution/</a></p>
	<p>apply the 1.1 science skills in the context of the content of this topic.</p>	1.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigating Interactions with Water</b>	<p><b>Students should be able to:</b></p> <p>describe and apply the term <i>dissolve</i>.</p> <p>predict and describe how various materials (vinegar, milk, baking soda, powdered drink mix, sugar, salt, sand, oil, soil, rocks) act when mixed with water.</p> <p>classify liquids and solids into those that will dissolve in water and those that will not. Use picture graphs, tables, and/or charts to record and display the information.</p> <p>infer that some substances will dissolve more easily in hot water than in cold water by conducting investigations using water at different temperatures.</p>	1.3	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p>	<p><i>Physical Science SOLutions</i> module:  <a href="http://www.smv.org/pubs/index.html">http://www.smv.org/pubs/index.html</a></p>
	<p>use their senses and simple tools, such as a magnifying glass, ruler, and thermometer, to enhance their observations of physical properties.</p> <p>classify and arrange objects or events according to at least two attributes or properties so that similarities and differences become apparent.</p> <p>communicate observations made and data collected orally and with simple graphs, pictures, written statements, and numbers.</p>	1.1		

<b>Organizing Topic</b>	<b>Essential Knowledge, Skills, and Processes</b>	<b>Related SOL</b>	<b>Sample Classroom Assessment Methods</b>	<b>Sample Resources</b>
<b>Investigating Interactions with Water</b> (continued)	answer questions by conducting simple experiments/investigations, using simple tools, such as thermometer, ruler, or magnifying glass. A simple experiment is one that changes only one thing at a time (tests only one variable), gives quick results, and provides easily observable changes.			
	apply the 1.1 science skills in the context of the content of this topic.	1.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
<b>Investigating Motion</b>	<p><b>Students should be able to:</b></p> <p>make and communicate observations about moving objects. Examples should include balls, objects with wheels, windup toys, tops, rubber bands, and playground equipment.</p> <p>predict an object's movement using its size, shape, and the force of the push or pull on it.</p> <p>conduct a simple experiment to determine an object's movement.</p> <p>describe and classify the motion of an object as straight, circular, curved, or back and forth.</p> <p>understand that vibrations may create sound, such as humming, strumming a guitar, or plucking a rubber band.</p> <p>record observations of movement (length/distance) using standard (English/metric) and nonstandard units.</p> <p>compare the movement of objects using graphs, pictures, and/or numbers.</p>	1.2	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p>	<p><i>Physical Science SOLutions</i> module:  <a href="http://www.smv.org/pubs/index.html">http://www.smv.org/pubs/index.html</a></p>
	<p>apply the 1.1 science skills in the context of the content of this topic.</p>	1.1		